



LECTURE FIVE

CONCEPTS AND DEBATES IN PSYCHOLOGY

PERCEPTUAL DEVELOPMENT

Topics



- Reductionism
- Mind - Body
 - Dualism
 - Monism
 - Interactionism
- Determinism – Free-will
- Nature – Nurture
 - Nativism
 - Empiricism
- Perception

Reductionism in Psychology



Complex psychological phenomena in terms of their simplest elements

- Biological reductionism:

Focus - brain functioning, chemistry, physiological aspects

- Search for the smallest element underlying human behaviour

Genetic bases for behaviour

“....the idea that psychological explanations can be replaced by explanations in terms of brain functioning or even in terms of physics and chemistry...”

(Garnham, 1991, in Gross, 1992)

Reductionism



- Behaviourism:

Mental phenomena shaped by conditioning in same way as observable behaviour

Challenge to reductionist view:

- Legge (1971, in Gross, 1992) – signing your name - neural and muscle activity

But

1) a signature has social meaning

2) a name can be signed differently each time (other hand etc.)

Action of signing is independent of particular physiological activity

Rose (1976) – hierarchy of levels of explanation



Sociological

Social Psychological

Psychological (mentalistic)

Physiological (systems)

Physiological (units)

Anatomical – biochemical

Chemical

Physical

Holistic (systems)



Reductionist (units)

Different scientific discourses

Mind-Body Debate



- **Consciousness**

- a property of human beings i.e. the human brain is considered essential for consciousness
- The brain is considered to have causal properties
 - it can affect our behaviour

- How can the mind and the brain be related?

Brain – possesses shape, size, density, weight, exists as an entity in space and time

Mind – possesses none of these properties

- How can something that has no physical existence influence and bring about change in something physical?

Dualism



Distinction between mind and brain

Cartesian dualism – the mind can influence the brain, but the brain cannot influence the mind (DeCartes)

- **Epiphenomenology**

Mind is a result of brain function - cannot influence brain

(e.g. Skinner)

- **Psychophysical parallelists**

No mind-brain interaction – just synchronicity

(e.g. Leibniz, 1714)

But – physical/psychological states of arousal?

- **Interactionism**

Both mental and physical events have causal power e.g.

- psychosomatic illness (mind/brain);
- drugs/alcohol – brain altering chemicals (brain/mind)

Monism



Idealism

Only minds exist – physical objects exist as ideas in people's minds

Not generally accepted in mainstream psychology

Materialism

Only material/physical phenomena are real

But – psychological disorders?



Identity Theory (monism) – consciousness is a brain process

'Consciousness' and 'brain process' refer to the same thing
(this form of identity is contingent) - (true as a matter of fact)
but do not have the same meaning (as do mother/female parent)

Contrast this approach to monism with materialism:

If mental and brain processes are contingently identical (identity theory)
then both mental and brain processes can influence behaviour

Middle Ground in the Mind-Body Debate?



- **Psychoneuroimmunology** – effect of emotional states and nervous system activity on the immune system
- **Psychophysiology** – effects of physiological processes on mental functioning.
- Conceptual interface between mind and body
- Role of emotions e.g. health and wellbeing



Determinism – Free-will



Free-will

- Do we have free-will to select life paths?
- Can we be what we want to be, make decisions and choices
- Can we determine our own lives
- Parameters – such as?

Social, environmental, political, religious, physical...

- Responsibility and blame – are people responsible for the decisions they make and the actions they take?

Legal systems are based on this view

Positivist view



- Behaviour is determined by external events - people respond to environmental stimuli
- Implies:
 - Order (stimulus-response)
 - Predictability (responses elicited by stimuli)
 - Every human action must have a cause
- Behaviourism – Skinner (1971)
 - Behavioural freedom is an illusion
 - Behaviour is a product of reinforcers (contingencies of reinforcement)
 - Illusion of free-will: absence of negative reinforcers and threat
 - Perception of free-will in others? Reinforcement histories?



- Contradiction - Skinner's imaginary utopia (1948 novel) - Do the elite need free-will to structure society and apply conditioning techniques?
- Hebb - 'control of behaviour by thought'
Occurrence of free-will does not refute causality, but it does refute the behaviourist argument that responses are caused by external stimuli
- Rational choice theory – we do things for reasons, not causes
What is the 'choice' mechanism?
- Causality - Determinism and Free-will: Human behaviour is caused – it is not random
But - source and nature of the cause?



- Determinism - Predictability?

Total predictability is impossible

The past cannot logically guarantee the future

Level of uncertainty regarding others' behaviours

- Lack of coercion - Free-will?

Free acts are free of coercion or compulsion – but could still be determined...

Soft determinism/Compatibilism - attempts to bring together determinist and free-will views

Suggests that:

- causes underlie physical events not mental activity
- we cannot control external events
- a level of restricted control over how we think about what happens in the external world

The Nature- Nurture Debate



Nativism (e.g. Descartes)

- Knowledge of the world is principally innate
- Heredity determines certain abilities
- Nature e.g. maturation/biological changes – underpinning stage theories



Empiricism (e.g. Locke)

- Mind = tabula rasa
- Experience and learning determine development/environment determines much of our behaviour
- Nurture e.g. behaviourism – models of normal/abnormal behaviour

Critical and Sensitive Periods



- **Critical period:**
 - An age range during which certain experiences must occur for development to proceed normally or along a certain path
- **Sensitive period:**
 - An optimal age range for certain experiences, but if those experiences occur at another time, normal development is still possible

The Nature- Nurture Debate



- e.g. Cognitive Development
 - Piaget
 - ✦ Maturation - importance of development of brain structures
 - ✦ Interaction with physical world - children seen as 'little scientists' actively trying to make sense of the world
 - Vygotsky
 - ✦ Importance of culture and the social world to development of thought

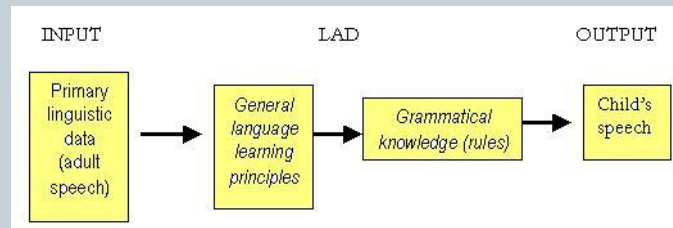
• Interactionism

Certain innate capacities and tendencies

Environmental influence regulates extent and way in which these develop

e.g. Language Development - Language Acquisition Device (Chomsky, 1965)

LAD = Innate capacity to learn the grammar of a particular linguistic community



Experience of language determines which language is learned and how well the capacity for language is developed e.g. phonetic discrimination in infancy (Maye, Weiss and Aslin, 2008)

LASS (Bruner)

Summary



- Reductionism
- Mind - Body
 - Dualism
 - Monism
 - Interactionism
- Determinism – Free-will
- Nature – Nurture
 - Nativism
 - Empiricism

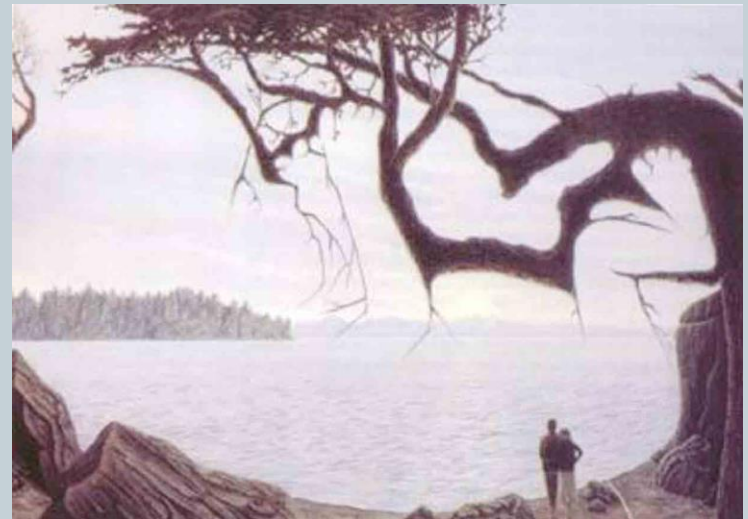
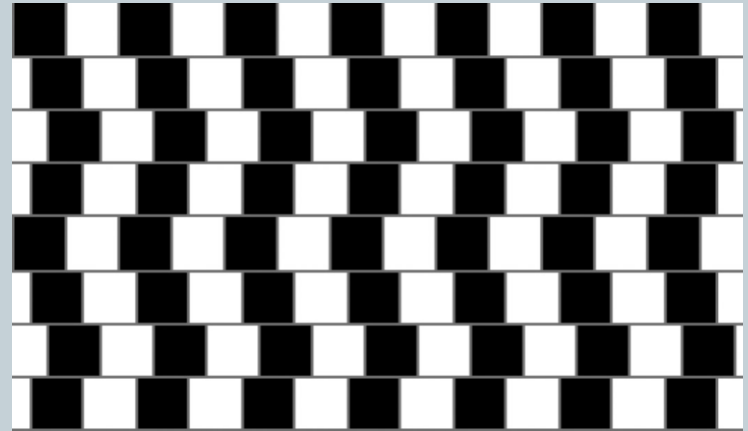


BREAK

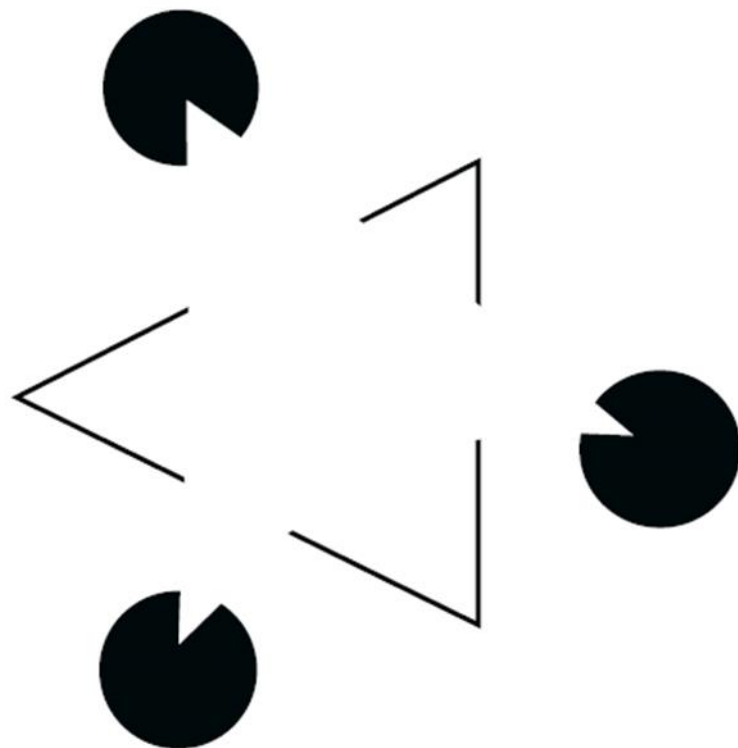
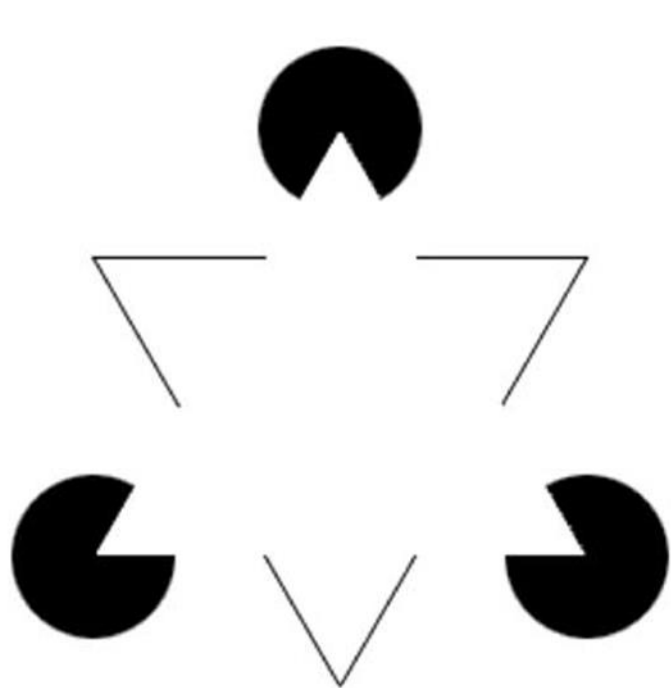


10 MINUTES!

Perception



Giuseppe's engravings



Perception & Perceptual Development



What is 'perception'? Nature v. Nurture

- Perception is a key area in the debate between nature and nurture
- Nature (nativism) - perceptual abilities are inborn
- Nurture (empiricism) - perceptual skills are learned

Studying Perceptual Development

1. New-borns
2. Animal deprivation studies
3. Human cataract patients
4. Cross-cultural studies



New-borns/Neonates



- Neonates visually explore their environment at birth
- Unable to see as clearly as adults – but can scan their environment and will pause to look at a person or object (Haith, 1980)
- Methods for researching infant perception:
 1. Preferential sucking
 2. Preferential-looking technique (Fantz, 1956)
 3. Habituation and dishabituation
 4. Principles of operant conditioning



Preferential sucking

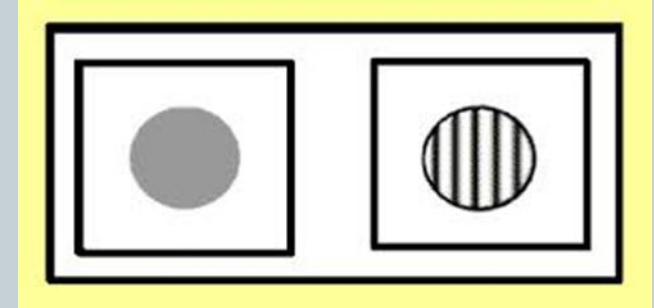
Measure speed of sucking a dummy when infant looking at familiar/novel stimuli



Preferential-Looking Technique

(Fantz, 1961)

- Babies (even newborns) prefer to look at a pattern than a plain surface



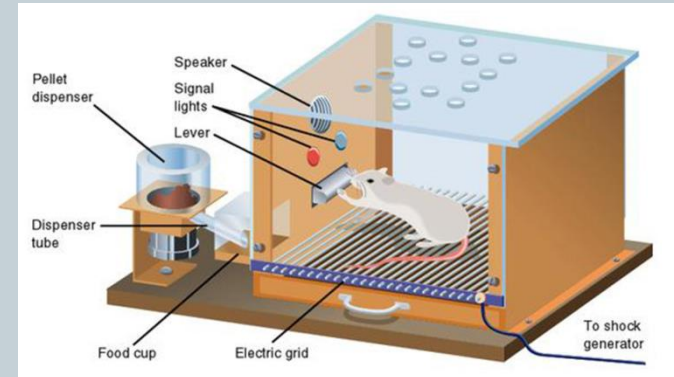
Habituation/Dishabituation

- Habituation: Repeatedly presenting an infant with a given stimulus until the response declines (i.e., they stop looking at it)
- Dishabituation: if response increases when a novel stimulus is presented - inferred that that baby can discriminate between the old and new stimuli



Operant Conditioning

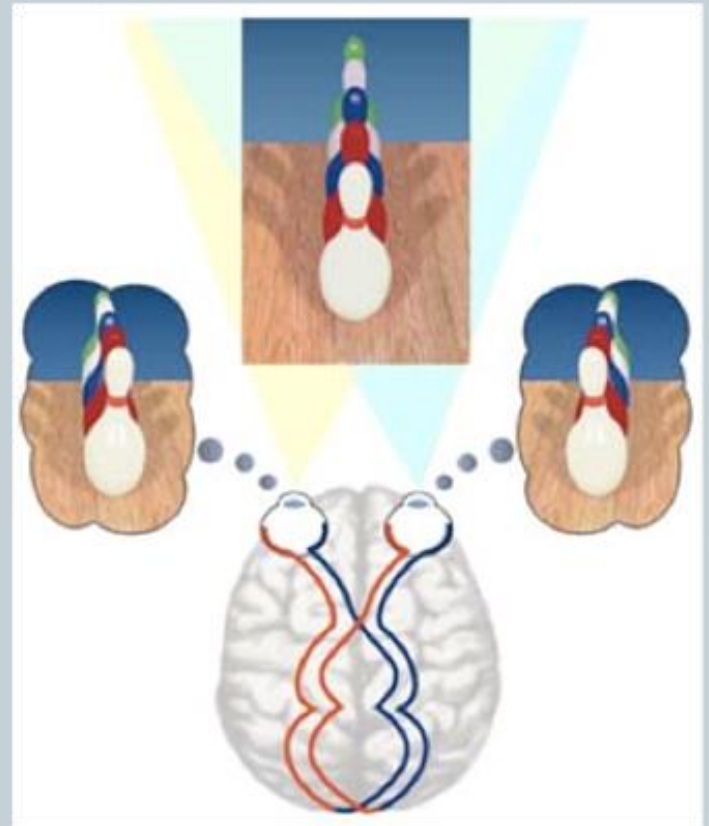
- Skinner (1904-1990)
 - Basic principles of learning apply in all organisms
 - Principles of reward and punishment
- Sound perception: train infant to turn their head when they hear a particular sounds by using the sight of an interesting toy as reinforcement
- Sound then varied to see if the child continues to turn their head
 - If the infants response continues when a novel stimulus is presented - inferred that the baby cannot discriminate between the old and new sound stimuli



Depth Perception



- Three kinds of information as cues to depth
 - Binocular cues
 - Monocular cues
 - Kinetic cues
- **Binocular cues:**
involves both eyes
(binocular disparity)



Retinal disparity

Cues to Depth



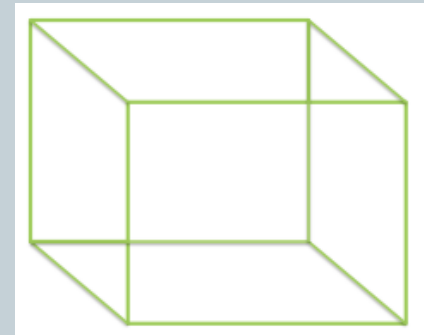
- **Monocular cues:** perceiving the distance of the object. Some of this can be processed by just one eye

Allport and Pettigrew (1957) and Yonas, Cleaves and Patterson (1978):

- Trapezoidal shape
- 5- and 7-month-old infants – patch over one eye
- 7-month-old infants reached towards longer side of shape
- Perceived it as being nearer than shorter side



Linear perspective



Necker cube



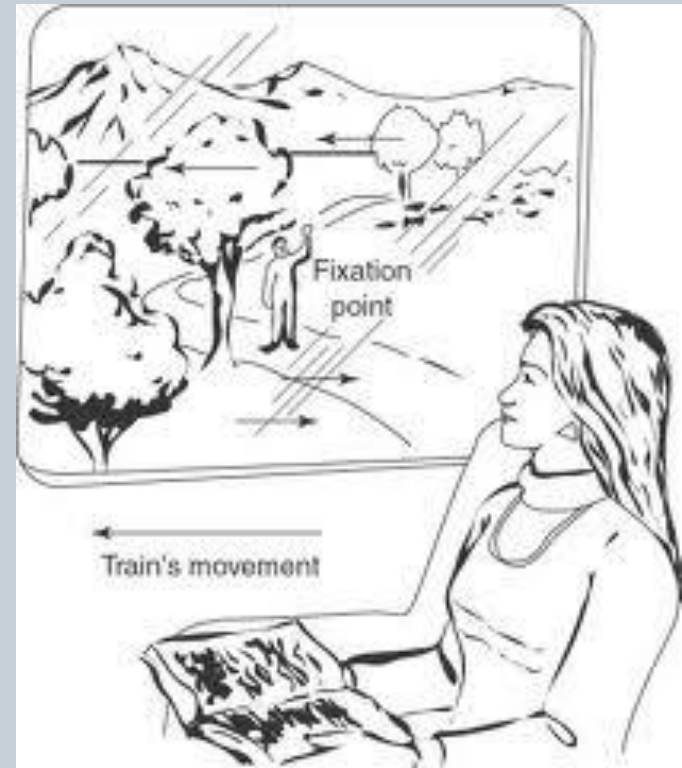
Trapezoid

Cues to Depth

- **Kinetic cues:** your motion or the objects motion (motion parallax)

Infants seem to use:

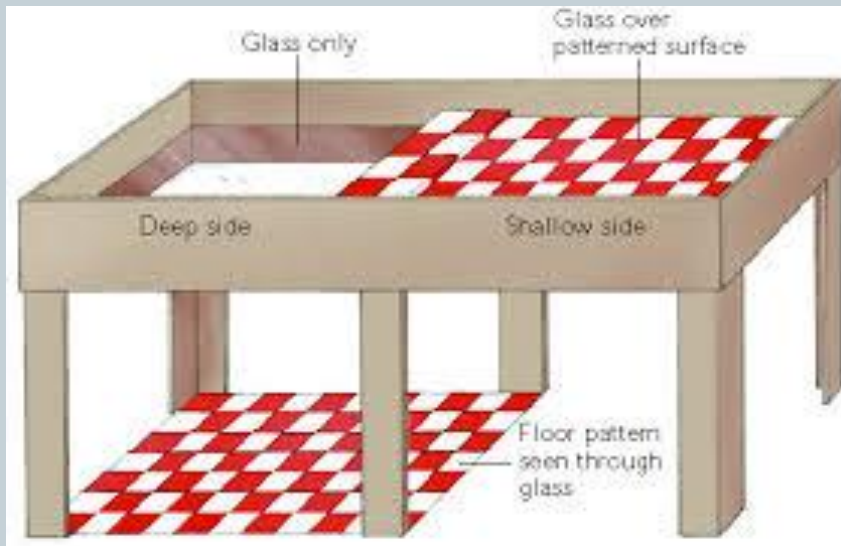
- kinetic cues first (approx. 3 months)
- then binocular cues (approx. 4 months)
- then monocular cues (approx. 5-7 months)



Depth Perception



- The visual cliff experiments (Gibson & Walk, 1960)
- If baby has developed depth perception they might be unwilling to 'go over the edge'
- Most infants happy to crawl around the shallow side of the table, but not to crawl over the cliff, even when encouraged by their mothers to do so



Studies of human cataract patients



- Studies of humans deprived of normal perceptual abilities at birth
- Once cataracts are removed – assumption that any perceptual abilities immediately present are innate or ‘unlearned’
- Von Senden (1932); Hebb (1949) – figural unity v. figural identity
 - **Figural unity** (detection) - available soon after removal
 - **Figural identity** (identification) - seems to require learning
 - Lack of perceptual constancy (e.g. method of display)
 - This evidence suggests that experience is crucial for the development of perception

Studies of human cataract patients

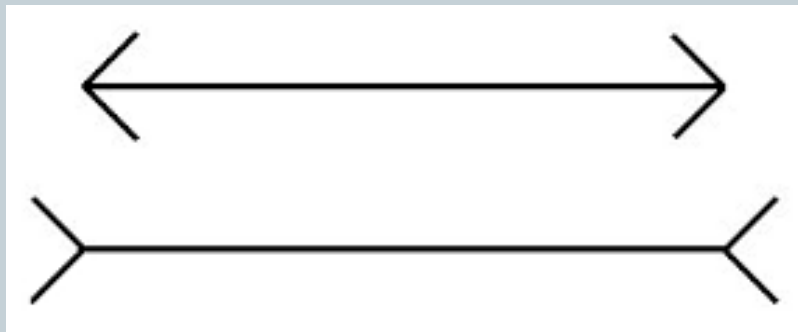


- Cataract patients are not the same as new-born babies
 - Other senses may have over-compensated
 - Not always prepared for their 'new world of vision'
 - Physical deterioration of system may have occurred
 - Case histories not reliable/objective method

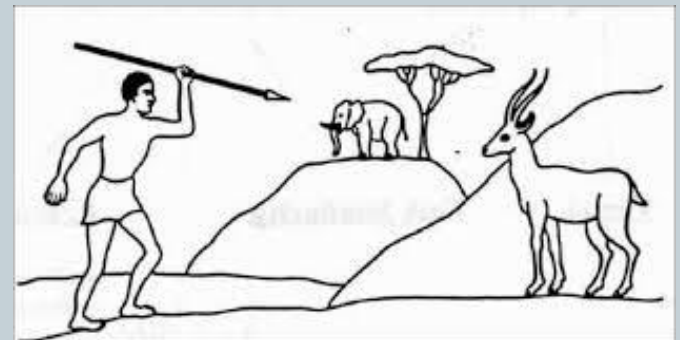
Cross-cultural studies



- The Carpentered World Hypothesis (Segall et al., 1963)
 - Cultural differences in susceptibility to illusions depending upon usually perceived environment
 - Western culture - world of straight lines and angles.
 - Illusions interpreted based on past experiences of the world - thus, 'depth' automatically added to perceptions of 2D images



Muller-Lyer illusion



Hudson (1960)

BUT – texture gradients
(e.g. adding grass – Kingsley et al)

Animal Deprivation Studies



- Can identify the consequences of perceptual deprivation on later perceptual skills or abilities
- Ethical issues - can manipulate the environment in ways which we could not do with humans
- Riesen (1947; 1965) - Studies with chimps. Reared three chimps from birth to seven months under three different conditions:

Debi: spend the whole time in darkness

Retinal damage

Kova: spent 1.5 hours a day exposed to un-patterned light (patterns of different colours and brightnesses)

No retinal damage but perceptual development retarded

Lad: raised in normal lighting conditions

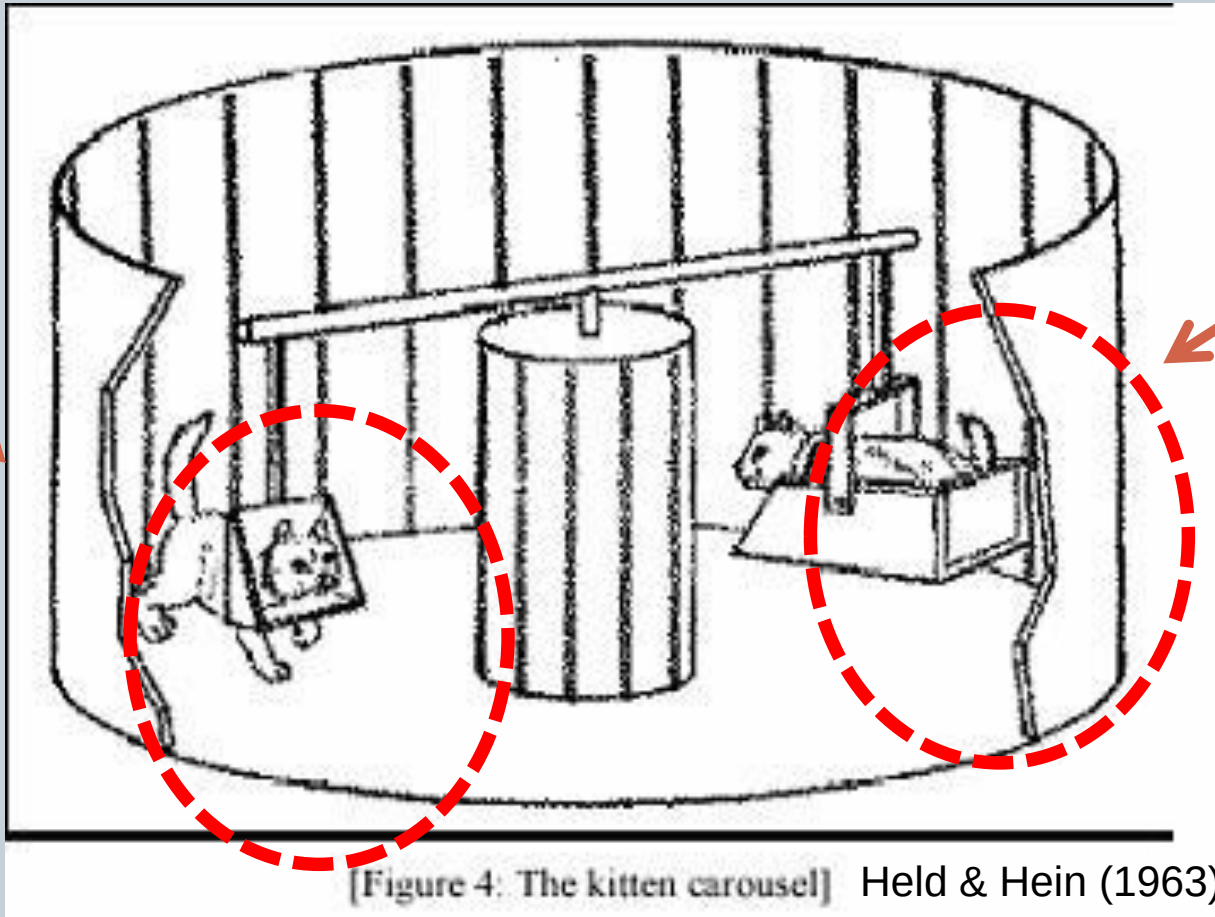
Normal vision

Animal Deprivation Studies



Paw-eye co-ordination and depth perception

Active
kitten



Passive
kitten



[Figure 4: The kitten carousel] Held & Hein (1963)

Animal Deprivation Studies

Perception of vertical and horizontal lines

- Blakemore and Cooper (1970)
 - Kittens raised from birth in darkness except for 5 hour daily period in a large round chamber
 - Chamber either had horizontal or vertical stripes
 - Visual cortex lacked cells to respond to unfamiliar lines



Evaluation of animal deprivation studies



- Ethical? Justified?
- We can only *infer* what their experiences are – they cannot tell us directly (same as new-borns!)
- We can only judge their perceptual abilities from their behaviour

Perceptual adaptation studies



- Stratton (1896) – one of earliest human perception studies
 - Wore inverted telescope / blindfolded
 - Adapted to ‘upside down world’ in just 87 hours over 8 days
 - Also imagined unseen elements as upside down
 - Had he learned to see the world in a different way?
 - When telescope was removed he immediately recognised the original world.
 - He had learned appropriate motor responses for the new world rather than a new way of perception

The Nature-Nurture Debate in Perception



Nature: the Nativist argument

- **New-borns** possess many remarkable perceptual skills
 - They appear to be born with 'rules' for looking, listening, and touching (Haith, 1980)
 - ✦ e.g., new-borns focus on contours and edges
- These rules change as the brain matures
 - ✦ e.g., 2-3 months, begin to analyse objects and figures in detail, and track objects smoothly
 - ✦ e.g., 4 months, depth perception and cross-modal perception becomes possible

The Nature-Nurture Debate in Perception



- **Nurture: the Empiricist issue**
- Stimulation and learning – infants deprived of stimulation show retarded perception and motor skills
 - Orphan babies in Iran who were deprived of free movements and objects to perceive shown impeded perception development
(Dennis, 1960)
- Maintenance – animals deprived of light show deterioration in visual perceptual system (Hubel & Weisel, 1963)

Summary – an ‘interactionist approach’



- Not only nature *or* only nurture
- **Born** with certain capacities and **environmental factors** are crucial for determining *how* and *whether* these capacities develop
- Basic perceptual skills more likely to be innate (nature)
- More complex abilities (i.e., illusions, depth perception) are more susceptible to environmental experience (nurture)

Useful Reading



Gross, R. D. (2010). *Psychology: The science of mind and behaviour*. (6th ed)
London: Hodder and Stoughton.

Chapter 49: Free Will and Determinism, and Reductionism, pp. 792 – 807.

Chapter 50: Nature and Nurture, 808 – 820.

Chapter 16: Development of Perceptual Abilities

Perform your own literature search for further reading on these concepts and debates.

Gross (2010) = key text.

However, **do not rely upon only one text** to learn each topic